

## CLAIMS

WE CLAIM:

1. A solid state waveguided structure, comprising:

- (a) a core fabricated of a lasing medium, said core having an outer surface; and
- (b) a cladding fabricated of a laser-inactive material, said cladding diffusion-bonded to said outer surface of said core,

wherein said lasing medium of said core comprises a crystalline or glass material doped with ions.

2. The structure as claimed in Claim 1, wherein said structure comprises:

- (a) a central section having a first end and a second end, said first end being terminated at a first bottleneck section and said second end being terminated at a second bottleneck section; and
- (b) two substantially identical end sections, a first end section and a second end section,

wherein said first end section is associated with said first bottleneck section, and said second end section is associated with said second bottleneck section, thereby making said end sections integral with said central section.

3. The structure as claimed in Claim 1, wherein said core comprises a rod, said rod having a polygonal cross-section.

4. The structure as claimed in Claim 1, wherein said crystalline or glass material further comprises a lutetium-aluminum-garnet material.

5. The structure as claimed in Claim 1, wherein said ions are selected from a group comprising ytterbium, neodymium, or thulium.

6. The structure as claimed in Claim 2, wherein said central section is substantially in a form of a cylinder.

7. The structure as claimed in Claim 2, wherein each of said end sections is substantially in a form of a cylinder.

8. The structure as claimed in Claim 2, wherein a combined length of said first bottleneck section and of said first end section is between about 6 millimeters and about 8 millimeters.

9. The structure as claimed in Claim 3, wherein said polygonal cross-section is substantially in a form of a square.

10. The structure as claimed in Claim 6, wherein said cylinder has a diameter between about 1.5 millimeters and about 2.5 millimeters.

11. The structure as claimed in Claim 7, wherein said cylinder has a diameter between about 6 millimeters and about 7 millimeters.

12. The structure as claimed in Claim 9, wherein said square has a dimension of a side between about 0.5 millimeters and about 1.5 millimeters.

13. A method of fabricating a solid state waveguided structure with improved characteristics, comprising steps of:

- (a) providing a core fabricated of a lasing medium, said core having an outer surface; and
- (b) ensconcing said core in a cladding fabricated of a laser-inactive material, said cladding diffusion-bonded to said outer surface of said core,

wherein said lasing medium of said core comprises a crystalline or glass material doped with ions.

14. The method as claimed in Claim 13, wherein said structure comprises:

- (a) a central section having a first end and a second end, said first end being terminated at a first bottleneck section and said second end being terminated at a second bottleneck section; and
- (b) two substantially identical end sections, a first end section and a second end section,

wherein said first end section is associated with said first bottleneck section, and said second end section is associated with said second bottleneck section, thereby making said end sections integral with said central section.

15. The method as claimed in Claim 13, wherein said core comprises a rod, said rod having a polygonal cross-section.

16. The method as claimed in Claim 13, wherein said crystalline or glass material further comprises a lutetium-aluminum-garnet material.

17. The method as claimed in Claim 13, wherein said ions are selected from a group comprising ytterbium, neodymium, or thulium.

18. The method as claimed in Claim 14, wherein said central section is substantially in a form of a cylinder.

19. The method as claimed in Claim 14, wherein each of said end sections is substantially in a form of a cylinder.

20. The method as claimed in Claim 14, wherein a combined length of said first bottleneck section and of said first end section is between about 6 millimeters and about 8 millimeters.

21. The method as claimed in Claim 13, wherein said polygonal cross-section is substantially in a form of a square.

22. The method as claimed in Claim 18, wherein said cylinder has a

diameter between about 1.5 millimeters and about 2.5 millimeters.

23. The method as claimed in Claim 19, wherein said cylinder has a diameter between about 6 millimeters and about 7 millimeters.

24. The method as claimed in Claim 21, wherein said square has a dimension of a side between about 0.5 millimeters and about 1.5 millimeters.